mRPC Test Lab Workplan

procedure name

PHENIX Procedure No. PP-2.5.5.6-13

Revision: A **Date:** 5/17/2013

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

- *Typo: On the Revision Control Sheet, the "Approved By" column is blank. It should have 4 names on it, since this procedure was signed by 4 people.*

Approvals

5/29/13
PHENIX S/E & I — Date
DON LYNCH

5/29/13
Cognizant Scientist/Engineer — Date
MICKEY CHIU /Activity Manager

5-30-13
PHENIX QA/Safety — Date
PAUL GILBOTTE

5/30/13
RHIC ES&H — Date
YOUSEF MAKDISI

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PHENIX S E & I	Date	Cognizant Scientist/Engineer /Activity Manager	Date
PHENIX QA/Safety	Date	RHIC ES&H	Date

REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	AUTHOR	APPROVED BY	CURRENT OVERSIGHT
A	New workplan derived from RPC Factory Workplan, PP-2.5.5.6-11	5/17/2013	D. Lynch		D. Lynch

Work Plan for Building 912 PHENIX mRPC Test Lab

Low Hazard – Worker Planned Work for Users

Original Issue October 2007, revised January 2008, January 2009, January 2010, April 2011 and April 2013
Job Location: Building 912 D line area

Operation Manager:
Mickey Chiu _____Date_____

Liaison Physicist:
Yousef Makdisi _____ Date _____

Liaison Engineer:
Dave Philips _____ Date _____

Work Control Coordinator:
Don Lynch_____ Date _____

C-A Approval: _____ Approval Date _____
(ESHQ Division Head)

Page: 1 to Page: 8

Worker Planned Work for Users at the PHENIX Test Area located in Building 912

April 2013

1. Introduction

Work Planning

This process applies to all physical work performed by BNL and non-BNL staff. Work Planning uses a graded approach to identify hazards, risks, and complexity levels of a task and to establish the level of rigor for planning and review. The process requires use of a site-wide work permit form (enhanced work permit, "green form") for all moderate and high hazard work. **Worker Planned Work** [applies to low hazard and risk work] recognizes the capabilities of the work force. Personnel have the skill and technical capabilities to handle a wide variety of jobs with minimum documentation.
Worker Planned Work is formalized in three steps:

Pre-Job Brief

Job-Site Walk Down

Post Job Review

Pre-job Briefing Questions I Ask Myself Before I Start Work:

* What are hazards for this particular work? How will I control them?
* What are the critical steps to complete this work safely?
* What can go wrong? What do I do if something goes wrong?
* What actions do I take if a new hazard is found while I am working?

Job-Site Walk-down I Do Before I Start Work:

* I thoroughly examined the job site
* I ensured all hazards were identified and controls were adequate
* I ensured my work will not affect other operations, and conversely
* I ensured the risk level was low and I based this on job complexity, coordination need between groups and hazards for the work

Post-Job Feedback I Will Give to My Supervisor:

* Task was/was not accomplished with expected results
* Procedures and work documents were/were not accurate
* Work planning and scheduling was/was not optimized to reduce human error or re-work
* Job-site resources and information were/were not sufficient
* My training for the job was/was not appropriate

Questions I Ask Myself Each Job and Each Day I Work:

What hazards are present for this job?

Is my supervisor or work planner aware of the hazards?

What part of this job concerns me? Have I asked for help?

What training/knowledge is needed to do the job safely?

Why do/don't people get hurt in my Group?

What is the safety climate at C-AD?

What are C-AD's standards for safety (intended & actual)?

What needs to be improved here?

Where are the danger zones for this job? What could go wrong?

What did the pre-job briefing and/or job-site walk-down cover?

Would more written procedures help me with my job?

Do I feel that I have adequate tools and PPE for this job?

Are Postings confusing or inappropriate?

Many of the tasks necessary to maintain and repair apparatus will be carried out by Physicists (Ph.D. and students). Much of this work is deemed to be within the "Worker Planned Work" and as such does not require additional work planning or work permits. The purpose of this document is to define which sorts of tasks fall within this "Worker Planned Work". The following requirements apply to all personnel working at the assembly area:

- No one person is allowed to work alone.
- The Operations Manager (see appendix A) or designee will be informed of specific personnel working in the area, their duties, and their time schedule.
- All work will be performed by authorized and appropriately trained personnel listed on a published roster maintained current by the Operations Manager or designee, with a copy of this approved document at the mRPC test lab entrance.
- If tasks are not listed as "Worker Planed Work", consultation is required with a PHENIX Work Control Coordinator and/or Operations Manager, or the liaison engineer/ liaison physicist, to evaluate the task.
- Building 912 access is allowable for only those who have completed Collider User Training. Entry into any areas of building 912 that are posted "Radiation Area" is prohibited unless the individual has current Radiation Worker 1 training and follows the RWP requirements.
- All personnel should be aware of adjacent areas which are posted for ODH areas. These areas may only be entered by personnel trained for the appropriate ODH level, equipped as necessary and in compliance with BNL requirements for ODH areas.

2. Electrical

Work on electrical devices is deemed Worker Planned Work:

- Voltage is < 50 V AC (or DC); AND maximum current is < 5 mA or stored energy is < 10 Joules.

Electrical Circuit Breaker and Electrical Disconnect operation (> 50 VAC or DC) is <u>PROHIBITED by USERS</u> without specific authorization and electrical worker safety training.

Examples of tasks allowed under this definition include:

- removing and replacing electronic modules in VME, NIM, and CAMAC crates.
- connecting and disconnecting front panel cables (lemo, BNC, etc.) from electronics modules.
- instruments, detectors, and data acquisition systems may be tested and analyzed using conventional diagnostic equipment such as digital multimeters, oscilloscopes, network analzers, etc
- cabling of the test stands readout and HV connections while power to the racks is switched off
- operation of test equipment to perform acceptance and performance testing (e.g. cosmic ray testing) and data taking shall be described in (a) test procedure(s) to be reviewed by appropriate PHENIX and C-A personnel. Such procedure(s) shall be read and acknowledged by all persons participating in any way in such tests and a copy of the procedure(s) shall be attached to this work plan.
- using logic analyzers to debug circuit boards.
- using Multimeters to check various currents and voltages on circuit boards.
- Using a computer (connecting and disconnecting computer to electrical outlet, connecting and disconnecting peripheral equipment to computer, turning on and off, etc.).
- Soldering of mRPC readout electronics with lead-free solder

Examples of tasks which are **<u>not allowed</u>** under this definition include:

- working with 110, 208, or 480 VAC line power sources.
- operation of 110VAC circuit breakers or disconnects
- measuring the output of the PMT High Voltage supply with a hand held multimeter.

3. Mechanical

Movement of mechanical equipment around the PHENIX Assembly Area is allowed if:

- **No objects greater than 40 kg is to be lifted by hand**
- **The lifting of objects greater than 20 kg is done by two persons**

Examples of tasks allowed under this definition include:

- moving computers around the facility
- moving hodoscopes into the test-stands
- removing crates from electronics racks (once they have been unplugged)
- carrying diagnostic equipment (multimeters, oscilloscopes, logic analyzers, etc.) around the facility.
- use of portable mechanical lift table (i.e. foot operated)
- Assembly of mRPC components and support structures shall be in strict accordance with appropriate engineering design drawings and written assembly procedures reviewed and approved by cognizant PHENIX and C-A personnel.
- small amounts of gluing of light-guides with optical cement Saint-Gobain Company BC-600 using rubber gloves for skin protection and application of cement outside tent area, corresponding MSDS placed at the facility.
- Use of hand operated power tools (battery powered or 110 VAC).

Examples of tasks **not allowed** under this definition:

- operation of building cranes
- operation of hydraulic systems
- operation of forklift
- operation of manlifts or working on scaffolding
- use of rigging equipment (e.g. come-alongs, etc.)
- use of bench mounted power tools

Only safety rated ladders (wood ladders are prohibited from use at C-A) are to be used, and a second person must be present for working on a ladder at heights above 1.2 meters (4 feet) or must be present during the tie off procedure. Anyone using aladder for any person shall have appropriate BNL ladder training.

4. Radiological

Building 912 PHENIX Assembly Area is a Radioactive Material Storage Area. It is posted as a **Controlled Area, Activation Check Required**. All existing material that is in building 912, except for materials brought in by PHENIX, must be checked for residual radiation by a Health Physics Technician (ext. 4660) prior to removal from the building.
Areas of the building adjacent to the PHENIX Assembly area are cordoned off with radiological signs and boundaries (yellow and magenta rope). Do not go beyond these barriers.
Past experimental work in this building has impacted the internal building environment. The wall, floors, ceiling may contain residual radioactive material, chemical residues, or metal

contamination. Personnel should refrain from sitting on the floors or concrete walls minimizing contact with your skin. Eating, drinking or smoking is prohibited in this building. Proper hygiene is required in this area, hand washing is recommended prior to eating, drinking or smoking outside of this area.

5. Personal Protective Equipment (PPE)

PPE is required for many tasks outlined in this Work Plan. Specific PPE requirements will be issued from the Operation Manager or designee depending upon the task. The following are minimum requirements for PPE use in building 912:

Safety Glasses: Approved safety glasses with side shield are required for any work that may cause mechanical impact, particle inclusion, or chemical exposure to the eye.

Safety Shoes: Approved safety shoe are required when moving heavy objects, when the potential for personal exposure to abrasion, impact or other mechanical damage exists. Closed shoes are always required in building 912.

Gloves: Work gloves are required when the potential for personal exposure to abrasion, penetration, mechanical damage can occur. Specific gloves may be required for chemical and thermal exposures.

Hardhat: Required when working below an operating crane, or when working below others.

Shirts and Pants: Proper personal protective equipment (PPE) shall be worn at all times. In the absence of any superceding requirement, long pants are required at all times, long sleeve shirts are recommended.

6. Environmental

All waste materials shall be properly disposed of as per C-A Department and Laboratory's requirements.

Report all spills or releases of any potentially activated or hazardous materials immediately to the MCR ext. 4662 or CAS Watch ext. 2024, or C-A ESSHQ Division Head, Ray Karol ext. 5272. Immediate response to spills greater than 5 gallons are to be reported to BNL Spill Response Team at ext 2222. Disposition of test components, assemblies, and peripheral equipment associated with the assembly area are the responsibility of the experimental collaboration.
The C-AD Environmental Coordinator (Bill Needrith x 4713) can be consulted in the removal of waste.

7. Training

- Collider User Training (AD-CA_COLLIDER_USER)
- Hazard Communication (HP-IND200)
- Cyber Security (GE-CYBERSEC)

- PHENIX Awareness Training (RC-PAT)
- Electrical Safety I
- Ladder Training (as required)
- ODH training (as required)

8. Work other than Worker Planned Work

Any tasks which do not fall within the definitions given above for worker planned work either:

> The tasks are performed by persons who have been trained, and are documented as trained, in the procedure associated with that specific task.
>
> **OR**
>
> Require further work planning (enhanced work planning). For PHENIX this enhanced work planning consists of preparing and enhanced work permit, evaluating all risks, establishing appropriate approved procedures, with the procedure acknowledged/approved by the individual(s) performing the task, the Operations Manager, Work Control Coordinator, Safety Officer and/or Liaison Engineer as determined by the PHENIX Work Control Coordinator in accordance with C-A enhanced work planning procedures."

Examples of tasks which require further work planning are:

- Modifications to facility air, gas, or water systems
- Installation, modification, or upgrade of electrical cabling
- Operation of circuit breakers
- Removal or use of CAD stored equipment in building 912.

9. Notifications

When working off hours at the mRPC factory notify CAS Watch at x 2024 when coming into the area and when leaving.

When leaving the mRPC area with gas flowing into test camber, inform CAS watch at x 2024.

10. Emergency Response

In the event of an emergency:

- If audible and/or visible gas alarms occur, evacuate the building, wait for CAS then call mRPC safety system experts.

This is a precautionary evacuation to allow CAS and system experts to trouble shoot and reset system.

- For fire alarms, evacuate building, wait for CAS and/or emergency personnel to arrive and follow their instructions. When safely evacuated call 2222 and supply any pertinent information, then call mRPC system experts. Personnel shall assemble and wait in the Hold Area (Parking lot to the north of the mRPC Test Lab), until such time as CAS and/or emergency personnel determine that it is safe to return to work.

- For any other emergency, call 2222. If it is safe to do so, place all equipment in safe condition, render first aid/CPR if necessary. Call mRPC safety system experts.

CAUTION

If there has been any gas interruption or power outage at the mRPC test lab **DO NOT ENERGIZE** any electrical equipment attached to the test chamber until the test chamber has been purged of test gas mixture. It is the responsibility of the Operation Manager or designee that this precaution is followed to mitigate any risk of buildup of flammable/explosive gas in the test chamber in the prescience of an ignition source.

11. Additional Related Documents Appended to this Document

Document # PP-2.5.2.20-1 PHENIX mRPC Gas System OPS in the mRPC Test Lab

Document # PP-2.5.2.20-2 PHENIX mRPC HV & LV OPS in the mRPC Test Lab

Document # PP-2.5.5.6-12 mRPC Safety System Blue Sheet Certification Test Procedure

(NOTE: Additional documents may be added to the above as the relevancy and/or necessity of additional tasks is identified. All references to these documents shall be construed to refer to the current revision.)

IF YOU ARE NOT CERTAIN OF THE REQUIREMENTS AND AUTHORIZATIONS FOR THE TASK, STOP WORK AND CONTACT ONE OF THE PHENIX WORK COORDINATORS.

APPENDIX A: mRPC Test Lab Key Personnel

Operations Manager: Mickey Chiu, ext.8428

Liaison Physicist: Yousef Makdisi, ext.4932

Liaison Engineer: Dave Phillips, ext. 4671

Work Control Coordinators: Don. Lynch, ext. 2253

Safety System Expert: Paul Giannotti, ext. 3815